REMARKS

Applicant thanks Examiner Kackar for his continued careful examination of the application. Herein, claims 1, 11, 15 and 20 have been amended to delete "mechanically." New dependent claims 35 and 36 have been added. Basis for the new claims can be found in the application as-filed. No new matter has been entered.

Drawings

The Examiner has required that the drawings be amended to illustrate the feature of substrate 130 being adhered to the carrier by an adhesive. Submitted herewith is a Replacement Sheet in which Fig. 1 has been amended to schematically illustrate an adhesive between the substrate 130 and the carrier 120, support for which can be found in the application as-filed. In conjunction with the drawing objection, the Examiner stated that "Fig 1-Fig 4 show the substrate being clamped to the carrier," citing "clamp like protruding section of frame '112' which appears to clamp the substrate 130 to carrier." Office action, ¶ 2. Applicant submits that the figures do not illustrate clamping the substrate to the carrier. The drawings are not necessarily to scale, and the "protruding section of frame '112'" mentioned by the Examiner is not a clamp for the substrate, and does not necessarily even contact the substrate.

Section 112 rejection of claims based on "mechanically"

The claims have been rejected under 35 USC § 112, first paragraph on the ground that the carrier being "*mechanically* clamped in said frame" is not supported by the specification. Herein, "mechanically" has been canceled from the claims, thus obviating the rejection.

Section 112 rejection of claim 23

Claim 23 has been rejected under 35 USC § 112, second paragraph. The Examiner states that "the substrate can be released only by removing the adhesive," and also that "short circuit without removing voltage would short circuit the power supply to lead to a catastrophic damage." Respectfully, this rejection is traversed. In claim 23, the substrate and the carrier to which it is attached are collectively released from the chuck electrode by releasing the electrostatic force between the chuck electrode and the carrier. Claim 23 has been amended to make this clearer. Regarding the Examiner's second point, respectfully the claim does not

require that the voltage source will be energized during the "short-circuiting" step. Separately, even if it remained energized, there is no certainty that catastrophic damage would occur; the voltage source could be designed to withstand the short circuit used to release the attractive force between the chuck electrode and the carrier. Accordingly, the "catastrophic damage" noted by the Examiner is not inherent in claim 23, and the rejection should be withdrawn.

Rejections of claims 1, 11, 15 and 20 based on Tokisue

Claims 1, 11, 15 and 20 (all of the independent claims) stand rejected under 35 USC § 102(b)/103(a) as being anticipated by or obvious over Tokisue. These rejections are respectfully traversed for all the reasons already of record in Response "E" filed September 11, 2008, and in Amendment "F" Submitted with RCE Under Rule 1.114 filed January 29, 2009, the entire contents of which are incorporated herein by reference.

Summary of Tokisue

Tokisue discloses a handling device for transporting a wafer 1' into and out of different processing stations in a "semiconductor producing apparatus of a multi-chamber type...shown in Fig. 2." Col. 4, lines 28-30. The handling device includes a hand body 2 having "a holder surface 2A for attractively holding the object 1 [such as wafer 1']" while being transported between processing stations by the hand body 2. Tokisue discloses numerous embodiments of the holder of the hand body, including the two illustrated in Figs. 19 and 20 cited by the Examiner. The structures shown in Figs. 19 and 20 are embodiments of the holder for holding a wafer 1' during transport by the hand body 2, having the surface 2A (illustrated and identified by number in Figs. 19 and 20) to which the wafer is electrostatically attracted during transport. Thus, initially it must be recognized that the holder embodiments illustrated in Figs. 19 and 20 are not electrostatic chucks in a processing station where a wafer 1' is to be treated, although the Examiner has treated these embodiments as analogous to the claimed structure having an chuck electrode and a carrier for examination purposes.

Regardless, the holder embodiments shown in Figs. 19 and 20 do not include a frame and a carrier clamped in a frame that are electrostatically retained to a chuck electrode during a processing step, and then released. The entire assemblies illustrated in Figs. 19 and 20 constitute respective embodiments of the holder for the hand body 2 in Figs. 1-2, to which a wafer 1' is attracted by application of a voltage during transport. Once the desired transport of the wafer 1'

has been achieved, the voltage is removed and the wafer 1' separates from the hand body 2. It is clear that the wafer 1' does not take any portion of the hand body 2 with it. It cannot be disputed that all the elements of the hand body are intended to remain together as a wafer 1' is picked up from one processing station to be transferred to another as shown schematically in Fig. 1. Hence, in Tokisue and particularly Figs. 19 and 20, there is no separate carrier to which the substrate is secured and frame in which the carrier is clamped, distinct from the conductive ceramic 20 (*cf.* chuck electrode) that supplies the opposite pole of the capacitive circuit to attract the wafer 1' thereto for transport when energized. Tokisue is a fundamentally different structure than that claimed.

Tokisue does not anticipate or render obvious claims 1, 11, 15 and 20

Tokisue does not disclose or suggest the combination of a carrier having or adapted to have a substrate secured to the carrier, wherein the carrier is clamped into a frame, and the carrier has a conductive layer that forms a capacitive circuit with a chuck electrode, to retain the entire carrier assembly (frame, carrier clamped in the frame and substrate secured to the carrier surface) in position adjacent the chuck electrode. As explained in the prior responses, clamping the carrier into the frame and using the carrier to form a capacitive circuit with a chuck electrode as claimed results in all of the associated stresses of repeated clampings and positionings in different processing stations to be borne by the carrier and not the substrate. The substrate is a thin and often fragile layer, for which it is desirable to avoid repeated clampings and external manipulations to grasp, transport to a processing station, release, re-grasp to remove from the processing station, and then repeat for each separate processing of the substrate. Under the claimed construction and unlike in Tokisue, the separate carrier undergoes all of these clampings and external manipulations between processing stations, not the substrate. In Tokisue, the hand body (embodiments of which shown in Figs. 19 and 20) electrostatically attracts and retains the wafer 1' directly, not a separate carrier or frame, to transport the wafer 1' between processing stations. This places stresses on the substrate resulting from the substrate itself repeatedly forming a capacitive-attractive circuit with the conductive ceramic 20 as in Tokisue. In addition, because the substrate is transferred by itself it may be more susceptible to damage due to impact with other elements. These stresses and risks are avoided in the claimed constructions, where all electrostatic and other manipulations are encountered by the carrier and the frame to transport the substrate between processing stations and to retain it in a processing station, instead of the

substrate itself.

These arguments are presented in greater detail in the aforementioned responses filed September 11, 2008 and January 29, 2009, which are incorporated herein. For brevity, those arguments are not being completely re-stated here, but the Examiner is respectfully requested to review the aforementioned submissions in response to the present Office action.

Adhesive is not "equivalent" to electrostatic retention of substrate

In the present Office action, the Examiner sets forth only one new argument: that it would have been obvious to substitute the adhesive securement of the substrate to the carrier as disclosed in the present application, with the electrostatic capacitive securement as described in Tokisue. Respectfully, this is false. As explained in the aforementioned responses, energizing the substrate ("wafer 1' " in Tokisue) to form a capacitive circuit to directly attract it to the conductive ceramic 20 results in all the stresses of the cyclic attractive forces, which are applied and released between separate processing stations, to be encountered directly by the substrate (wafer 1'). Conversely, adhering the substrate to a separate carrier, wherein the carrier undergoes the cyclic application and removal of the attractive forces, spares the substrate from wear and fatigue attributable to such cyclic application and removal of force.

Furthermore, there is absolutely no disclosure in Tokisue to electrostatically retain the substrate to a separate carrier, distinguishable or separable from the fixed conductive ceramic 20 of the hand body 2 in Tokisue, or the dielectric film 2' that is formed integrally therewith. In Tokisue, the dielectric film 2' is "integrally joined together [and] sintered" with the conductive ceramic 20. Col. 8, lines 15-23. Therefore, regarding claim 1 specifically (as well as other claims specifying the carrier to be removable from the chuck electrode), it cannot be disputed that this dielectric film 2' is permanently affixed to the conductive ceramic 20, and is not removable therefrom as required of the "carrier" in claim 1. There simply is no separate carrier in Tokisue, nor any element remotely comparable thereto. In fact, other than the wafer 1' itself (*cf.* substrate as claimed), there is no component whatsoever in Figs. 19-20 of Tokisue, the only figures cited by the Examiner, wherein any other structure is separable from the conductive ceramic 20 (or the grounded bed 16 in Fig. 20) to act as a carrier for the wafer 1'. Only the wafer 1' in Tokisue is reversibly attracted to the hand body 2 at the surface of the dielectric film 2', which is integral to the conductive ceramic 20. The wafer 1' is not secured to a separate carrier that interacts with the hand body 2 for transport, or that would interact with a chuck

electrode in a processing station. Only the wafer 1' in Tokisue is formed into a capacitive circuit with the conductive ceramic 20, and energized to retain the wafer 1'. The wafer 1' itself undergoes the electrostatic attraction and associated stresses each time it is engaged by the hand body 2, including resulting physical stresses (such as frictional damage) each time it is attracted to the surface 2A and then released. This is clearly different from the present claims, where the substrate to be processed (*cf.* wafer 1' in Tokisue) escapes these manipulations and forces, which are instead applied to the separate carrier on which the substrate is secured.

The Examiner has misinterpreted the claimed "frame" and "clamped in" structure to construct a rejection

In the present Office action, the Examiner argues at pp. 4-5 that the only function of the "frame" is to provide a conductive path to the conductive layer, and that "the conductive layer does not need any clamping to be attached to the dielectric carrier plate." He further states that "the term 'clamp' refers to a device which holds two parts together. In this case however, 'carrier' is only one part. Therefore part (5) of Tokisue et al reads on the term 'frame' or is at least equivalent to claimed 'frame.' " Office action, pp. 4-5 (emphasis original).

With great respect to the Examiner, his rejection makes no sense. It implies that the "carrier" as claimed somehow must be clamped together, but that because it is "only one part," the fact that the carrier is clamped in the frame, as claimed, can be simply ignored. The problem with this argument (as best understood) is that in the claims the carrier is not clamped together as if multiple pieces of the carrier need to be held together. Instead, the carrier is clamped in the frame.

The examiner's interpretation of "frame" and "clamped in" for examination purposes completely vitiates the expressly claimed structure to construct a rejection in hindsight. The claims all require a carrier clamped in a frame. The Examiner has simply ignored this claimed structure, to instead say that (as best understood) because the carrier is "only one part," it does not require any clamping as claimed. The undersigned is not aware of any legal precedent or authoritative source to justify the Examiner's holding that expressly-claimed structure should be ignored for examination purposes because the Examiner does not feel that structure is necessary.

Apart from ignoring (without basis) the claimed structure of a carrier clamped in a frame (as in all claims 1, 11, 15 and 20), the Examiner further states that the function of the frame simply "is to provide a conductive path to the conductive layer," without regard to its structure.

Having made this unsupported statement, the Examiner then cites element 5 in Figs. 19 and 20 of Tokisue as being the "frame" as claimed, apparently because element 5 completes the capacitive circuit between the conductive ceramic 20 and the wafer 1'. This argument is completely unsupportable. Element 5 in Tokisue is a spring member that supports a conductive portion 4 for contacting the wafer 1' to complete the capacitive circuit when the hand body 2 contacts it, so the wafer 1' can be lifted and transported. It is certainly not a "frame," and no "carrier" or any other member or element whatsoever in Tokisue can be said to be clamped in the spring member 5.

For the foregoing reasons, the spring member 5 cannot possibly be considered a "frame" as claimed. To do so would vitiate express structural language in the claim. Such is not permitted, even to give a claim term its broadest reasonable interpretation for examination purposes. An interpretation that contradicts the express claim language is not "reasonable."

The Examiner misinterpreted the grounded bed 16 in Tokisue to argue that reference discloses a removable carrier

With respect to the carrier being removable from the chuck electrode as in claim 1, the Examiner states that "the carrier is "further configured to be removably positioned adjacent a surface of a chuck electrode (Fig. 20 16) so that said carrier and said chuck electrode together form an electrostatic chuck device wherein the conductive layer of said carrier (20) and surface of said chuck electrode (16) form two plates of a plate-type capacitor...." In this specific rejection, the Examiner apparently holds that the grounded bed (16) in Tokisue is the chuck electrode, and the conductive ceramic 20 is the removable carrier. This argument fails for at least three reasons.

First, Tokisue never states or implies that the ceramic 20 is removable from the grounded bed 16. Instead, as seen at column 8, lines 29-35, the conductive ceramic 20 is sandwiched to a dielectric film 71 and "mounted on a bed 16 which is grounded." There is no mention that the conductive ceramic 20 should be removable from the bed 16. In fact, it is evident that the conductive ceramic 20 is not removable because all of Fig. 20 represents an embodiment of the holder device for the hand body in Fig. 2; *see* col. 8, line 29. Furthermore, the conductive ceramic is connected via an electrical circuit to the voltage source and to ground, all through the hand body. Removing the conductive ceramic 20 would sever these connections, namely lead wires 8 and 9 that are connected to the ceramic 20 and the spring element 5. This would render

the conductive ceramic 20 and elements 4 and 5 unfit not only for their stated functions in Tokisue, but for the function the Examiner would ascribe to them: to be a carrier for the wafer 1'. Without the voltage source connected, there would be no means to attract the wafer 1'. It is evident that the conductive ceramic 20 is a fixture on the holder of hand member 2, not a removable component.

Second, the Examiner's attempt to read the grounded bed 16 as the chuck electrode and the conductive ceramic 20 as the carrier completely vitiates the required frame from the claims, as well as the carrier being clamped in the frame. There is no frame in Tokisue. Element 5 is a spring member for conducting current to the wafer 1' so that the wafer 1' itself can be electrostatically attracted to the conductive ceramic 20. It is not a frame, and no carrier or other element is clamped into the spring element 5. The conductive ceramic 20 (which the Examiner asserts is a carrier) certainly is not clamped in the spring element 5.

Third, in Tokisue the wafer 1' is only attracted to the ceramic 20 when a voltage is applied between them. In that reference, that voltage is shut off to release the wafer 1' once it has been delivered to a desired location. *See* col. 4, lines 59-63. As will be appreciated, assuming *arguendo* the conductive ceramic 20 were a carrier as claimed, then as soon as the voltage was shut off the wafer 1' would fall off the carrier. This is contrary to the express structure of claim 1, 11, 15 and 20 where the substrate is "secured over substantially its entire surface to the carrier." It is also contrary to the purpose and function of the claimed invention, wherein the carrier can be used to transport a securely attached substrate into and out of one or more processing stations without repeatedly applying forces to or manipulating the substrate. Obviously, if the substrate were to fall off the carrier (not be secured thereto) in between transport steps, then the claimed carrier would fail of its purpose.

In Tokisue, none of this becomes an issue because in that reference the wafer 1' is independently attracted and released to/from the conductive ceramic 20 of the hand body 2 by energizing and de-energizing it in a capacitive circuit with the ceramic 20. At the conclusion of a transport step in Tokisue, the wafer 1' is released by itself. *See* Figs. 1 and 2 of Tokisue and the associated description at col. 4, lines 11 to 63, wherein handling device the wafer 1' is held by a hand body 2 of the handling device to transport it to or from multiple chambers where processing is to occur. It is plainly seen that the wafer itself is transferred, and not a carrier having the wafer secured over substantially its entire surface thereto. In Fig. 20, the ceramic 20

is never removed from the grounded bed 16 or the hand body 2, certainly not with the wafer 1' "secured over substantially its entire surface to the" ceramic 20.

In summary, Tokisue never teaches or suggests the conductive ceramic 20 is removable from the grounded bed 16. Quite the opposite is clear as explained above. Moreover, reading the ceramic 20 as a carrier does not answer the questions, 'where is the frame,' and 'how is the ceramic 20 clamped in that frame' in Tokisue. Spring element 5 is certainly not a frame, and the conductive ceramic 20 is not clamped in the spring element 5. Finally, treating the conductive ceramic 20 as a "carrier" and the grounded bed 16 as a "chuck electrode" results in the wafer 1' falling off the ceramic 20 as soon as the voltage is removed at the end of a transport step. This means even if the ceramic 20 was removable, it would not retain the wafer 1' thereto and would therefore fail of its essential purpose.

In the Office action, the Examiner stated that "carrier 20 is held capacitively to chuck electrode 10 [sic: grounded bed 16] through dielectric 71. Substrate is also held capacitively. However, to hold it through adhesive instead of capacitively, would have been obvious as being equivalent." Office action, p. 7. This argument ignores the absence of a frame, and that the carrier must be clamped in a frame in each of the independent claims. Separately it ignores the basic fact that the conductive ceramic 20 is not removable from the grounded bed 16 or the hand body 2 of which both form a part.

Summary regarding claims 1, 11, 15 and 20

For the foregoing reasons, independent claims 1, 11, 15 and 20 clearly are not anticipated by, or obvious over, Tokisue. That reference is clearly deficient to teach any of the following features, either alone or in combination:

- a carrier being clamped in a frame, as in all of claims 1, 11, 15 and 20;

- the carrier being made of a nonconductive dielectric material having a conductive layer disposed on or forming one side thereof, as in all of claims 1, 11, 15 and 20;

- the substrate being adhered over substantially its entire surface to the carrier, as in claims 15 and 20;

- the conductive layer of the carrier (not the substrate itself) and the surface of the chuck electrode forming two plates of a plate-type capacitor, as in claims 1, 15 and 20;

- the carrier for carrying an adhered substrate being removable from the chuck electrode as in claim 1;

- the frame being conductive at least in a region thereof, with the conductive layer of the carrier being in contact with said conductive region of the frame, as in claim 11.

Should the Examiner disagree and maintain the rejections over Tokisue, then **the Examiner is respectfully requested to articulate in detail precisely how and where Tokisue discloses or renders obvious each of the foregoing features** so that applicant will be in a better position to directly address those rejections on appeal.

Rejections of claims 16, 31-33 based on Tokisue and combination references

Claims 16 and 31-33 stand rejected under 35 USC § 103(a) as being obvious over Tokisue in view of De, Arita, Testsuro, Toya, Kumar or Jones. Applicants do not dispute that adhesives are known generally to adhere a substrate to a surface. What is disputed, however, is that any reference discloses or suggests the combination of adhering a substrate to be treated to a carrier that is clamped in a frame, wherein the resulting assembly can be retained in a processing station where the carrier, not the substrate, is electrostatically attracted to a subjacent chuck electrode. In particular, in the Arita reference cited by the Examiner, the substrate/tape 6/6a combination is not held via electrostatic attraction. Instead, a suction is applied via adsorption holes 3e to retain the substrate/tape 6/6a to the lower electrode 3 surface during plasma processing. No potential is applied to the substrate 6 or the tape 6a. Electrode 3 does not provide electrostatic attraction to the substrate 6 as the Examiner suggests. Instead, the lower electrode 3 acts in concert with the upper electrode 4 to direct plasma to treat the substrate 6 surface. *See* paragraphs [0016-]-[0023] and [0026]. There is no suggestion in Arita or otherwise to provide the unique structure claimed in claims 16 and 31-33, wherein a substrate is adhesively secured to a carrier, the carrier is clamped in a frame, and the carrier cooperates with the chuck electrode to form two plates of a plate-type capacitor to generate an attractive force between the carrier and the chuck electrode. The other cited combination references appear less relevant than Arita.

For the foregoing reasons, it is respectfully submitted that claims 16 and 31-33 are independently allowable over the cited art of record.

Section 102/103 rejections of claims 9 and 34

Claims 9 and 34 were included in the blanket rejection under Tokisue in the Office

action, although neither of these claims was separately addressed. Each of these claims is independently allowable over Tokisue.

Regarding claim 9, this claim states that the chuck electrode comprises a plurality of regions of different polarity. This feature is nowhere disclosed or suggested in Tokisue.

As for claim 34, this claim specifies that the chuck electrode is fixed at the processing station and that the frame is removable from the processing station to transport the carrier and substrate into and out of the processing station. This combination of features, namely including a removable frame, which itself has a clamped in carrier and a substrate adhered to the carrier, is nowhere disclosed in Tokisue. Even taking the spring member 5 in Tokisue as the "frame," which is clearly erroneous, that member 5 clearly is not removable from the conductive ceramic 20. The deficiency of Tokisue to disclose or suggest a removable frame/carrier is discussed in detail above.

Accordingly, claims 6 and 34 are independently allowable over the art of record.

New claims 35-36

Claims 35 and 36 are new dependent method claims, each specifying additional steps of removing the frame and the carrier clamped therein from adjacent the chuck electrode following a processing step. For reasons already explained, Tokisue does not disclose or render obvious any step of removing a frame and carrier from a chuck electrode. All the elements in Figs. 19 and 20 (save the wafer 1') are fixtures in the hand body 2. They are not to be removed. Accordingly, claims 35 and 356 are independently allowable.

Conclusion

For at least the above reasons, as well as those detailed in the above-incorporated responses that were previously filed, it is respectfully submitted that Tokisue, and particularly Figs. 19 and 20 thereof, do not disclose the features of the present claims discussed above. All claims not expressly discussed above are dependent claims, and therefore are submitted to be allowable as such. Accordingly, it is respectfully submitted that all claims in the application are in condition for allowance.

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Respectfully submitted,

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